

REMARKS

The Office Action dated February 12, 2003 has been received and carefully noted. As discussed during the telephonic interview which was conducted on May 7, 2003, the above amendments to the claims, and the following remarks, and the attached Interview Summary, are submitted as a full and complete response thereto.

As a preliminary matter the Interview Summary form indicated that the applicants must provide a statement to formally record the substance of the interview. Applicants attach, therefore, a Statement of Substance of the interview as required by MPEP §713.04.

Claims 6-16 have been cancelled without prejudice. Claims 17-29 are submitted, to particularly point out and distinctly claim the subject matter of the invention. Claim 17 is comparable to original claim 6, but includes the subject matter of original claim 7. No new matter has been added, and no new issues are raised which require further consideration and/or search. All of claims 17-29 contain subject matter which has already been examined; minor revisions and amendments have been made to the claims, but no new issues are raised.

In items 2 - 4 of the Final Action, the Examiner rejected claims 6, 7 and 13-16 under 35 USC 103 (a) as obvious in view of Wang et al. (United States Patent No. 5,771,382) in combination with Gamache et al. (United States Patent No. 5,202,991). The Applicant does not agree.

The Applicant submits that Wang et al. do not describe all of the limitations of the original claims 6 and 13-16, submitted as new claims 17 and 23-26, and that the missing limitations are not described by Gamache et al., either expressly or in an implied manner. As the limitations of the claims 17 and 23-26 are not described in these two references, a skilled artisan would not find a “convincing line of reasoning” that would lead him to the claimed invention.

As a matter of background, the Applicant notes that United States Patent No. 5,202,991 issuing to Gamache et al. describes technology which is quite different from that of the claimed invention.

The most important distinction is that Gamache et al. describe a monolithic operating system using a traditional UNIX kernel. New claim 17 includes limitations to an IPC message passing operating system, which is a completely different architecture from that of Gamache.

In an IPC message passing architecture, operating system calls generally require access to both critical and non-critical areas of the operating system. In general, a single operating system call will access the critical area of the operating system which performs a message passing operation, which passes the message to an external (and non-critical) software process which executes to perform the balance of the operating system call.

In a monolithic operating system such as that of Gamache, all operating system threads are executed as part of the kernel (and are “critical”), so there are no “non-critical” areas in the operating system. Thus, Gamache et al. cannot address the problems

that the invention deals with, and further, one skilled in the art would not look to Gamache et al. for assistance.

As a matter of background, applicant notes that United States Patent No. 5,771,382 issuing to Wang et al. also describes technology which is quite different from that of the claimed invention.

As noted during the conference call with the Patent Examiner, Wang et al. describe techniques which apply to user data, and not to code calls. More specifically, Wang et al. describe techniques for protecting uninitialized static variables, and not for protecting operating system calls. These techniques are generally known as semaphores in the art.

Semaphores are used to protect the integrity of data being stored, and not to protect operating system code being executed. As well, semaphores have been in existence for decades, yet no one has made the myriad changes and realizations which would be required to arrive at the method of the claimed invention. Specifically, to arrive at the invention of claim 17 given the teachings of the Gamache and Wang references, one would have to address at least the following:

- begin with an IPC message passing architecture;

- realize that there are inefficiencies with the current use of global locks to execute operating system calls in symmetric multi-processing (SMP) in IPC message passing architectures;

locate the Gamache and Wang references in the vastness of computer software literature (the ACM, for example, offers online access to more than 30,000 software and software related articles), and determine that these references have something to offer, despite the facts that:

- neither of these references describe an IPC message passing architecture;
- neither of these references describe or deal with SMP; and
- neither of these references attempt to address the problem of the invention, i.e. to improve the speed of execution of SMP architectures;

determine that Wang's use of semaphores to protect data stored in memory could also be used to protect code executing a processor (as operating system calls do).

Clearly, completely different functionality is require to protect stored memory, than to protect executing code. Neither Wang nor Gamache offer any advise on how executing code might be protected;

once one figures out how to protect executing code, one must realize that this functionality might be used to protect operating system calls. This is another awkward step to make, because neither Wang nor Gamache describe architectures in which operating system calls execute in both critical and non-critical areas; and

one must realize that the use of global locks only during access to critical areas of the operating system call will be more efficient than the traditional use of global locks during the entire call. Even after performing all of the above steps, this is still not an obvious progression.

A single operating system call may require multiple accesses to critical areas - one might easily assume that the increased overhead associated with managing the global lock (i.e. requesting it, waiting for it to become available, seizing the global lock, performing the call to the critical area, and releasing the lock), would offset any hoped improvement in efficiency.

Under item 5 of the Final Action, the Examiner made reference to the queries recited in *Graham v. John Deere Co.* with regard to obviousness. In this context, the Applicant submits that:

the differences between the cited prior art references and the invention are vast; that IPC messaging passing architectures and semaphores have existed for decades, yet no one has arrived at the method of the invention; and

as explained under item 11 above, the invention would probably be looked upon with skepticism because one would expect that the increased overheads introduced by the invention would offset any hoped improvement in efficiency.

The actual reception of the invention by industry has been the complete opposite. Copies of positive endorsements from industry are included under Tab B.

Applicant therefore submits that claims 17 and 23-26 are not obvious in view of the cited references, and asks that the Examiner therefore withdraw this rejection.

In item 4, the Examiner rejects claim 7. As this claim has been deleted, there is no need for the Applicant to respond. The subject matter of this claim has been added to new claim 17.

In item 5, the Examiner rejects claim 8 as obvious in view of Wang et al, Gamache et al. and Dangelo. The Applicant submits that it is difficult to see how a skilled artisan would be led so clearly to the invention as required by the test for obviousness recited above (i.e. the cited references must “expressly or impliedly suggest the claimed invention” as required by the Manual of Patent Examination Procedure, or the Examiner must present a “convincing line of reasoning”). The Applicant submits that the test is not satisfied.

To begin with, new claim 18 depends on claim 17, and thus, claim 18 includes all of the limitations of claim 17. As outlined above, claim 17 is patentable in view of the cited references.

The Applicant also notes that Dangelo is so remote from the invention that a skilled artisan would not look to it to deal with the problems of the invention. Dangelo seeks to provide an object-oriented, multi-media architecture that provides for real-time processing. This has nothing to do with the purpose of the invention, which is to improve the performance of symmetric multiprocessing systems by improving the lock-handling process.

The Examiner alleged that Dangelo shows micro kernel operating systems could be used in the application of the invention, but this argument fails for a number of

reasons. Most important is that Dangelo's definition of a "micro kernel operating system" is far different than the definition generally held in the art, and his definition certainly does not fall within that outlined in the specification (see page 6, line 34 through page 7, line 2 which reads that "A micro kernel operating system is one in <which> the operating system itself provides minimal services which delegate the usual operating system functions to external processes.") At lines 35 - 43 of column 9, Dangelo clearly defines his "micro kernel" operating system as what is known as a "monolithic" operating system, as it does far more internal processing: "The micro-kernel also attends to handling the network file system (NFS), networking operations, peripheral device drivers, virtual memory management, user interface, and other tasks for which the operating system conventionally is responsible." This is simply not a micro-kernel operating system as known in the art, and as defined in the specification.

Another important issue which the Examiner has not addressed, is how the limitations he has cobbled together from the Wang, Gamache and Dangelo reference would actually be combined into a working program. Software processes can always be described in terms of a small number of discrete steps, such as storing, transmitting, calculating and receiving. Taken individually, these discrete steps do not teach the reader anything, as almost every program has them. Only when these steps are taken in the context of a patent claim *as a whole*, do they accomplish anything. Citing one reference that describes locks, and another that describes micro kernel operating systems, tells the reader nothing about to incorporate locks into a micro kernel operating system. It is

therefore nonsense to allege that a claim is obvious simply because individual references can be found which recite certain elements of the claim.

In the case of claim 18 (and claim 17, for that matter), there is nothing in any of the references that suggests a micro-kernel operating system calls can be divided into critical and non-critical components, and that a CPU lock need only be held during the critical component of the call.

Thus, claim 18 cannot be considered obvious in view of Wang, Gamache and Dangelo, and the Applicant asks that this rejection be withdrawn.

The Applicant notes that the balance of the rejected claims (claims 9-12, now submitted as claims 19-22) all depend on claims 17 and 18, and therefore include all of their limitations. The Applicant submits that these claims therefore distinguish from the cited references in at least the ways described above. The Applicant therefore asks that the rejection of these claims therefore be withdrawn.

In view of the above amendments and remarks and having dealt with all the objections raised by the Examiner, reconsideration and allowance of the subject patent application is respectfully requested.


It is therefore respectfully requested that each of claims 17 through 29 be found allowable, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by

telephone, the applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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Enclosures: Petition for Extension of Time
Statement of Substance of Interview

STATEMENT OF SUBSTANCE OF INTERVIEW

The Interview began with a general discussion of the nature of the invention. It appeared that the Examiner understood the general purpose and principles of the invention, so the discussion turned to the question of whether the broad claims properly distinguished the invention from the prior art.

The Applicant emailed three amended versions of the broad claim (claim 6) to the Examiner, and questioned whether the claims would be considered allowable if claim 6 presently on file was replaced with one of the proposed claims.

The Examiner advised that he would not comment on the patentability of the proposed claims without further searching and consideration.

At that point, the discussion turned to the prior art cited in the Final Action. The Inventor pointed out that:

- I. With respect to United States Patent No. 5,202,991 issuing to Gamache et al.:
 - A. Gamache et al. describes a monolithic operating system, using a traditional UNIX kernel, which is distinct from the operating system of the invention. In a monolithic operating system, all operating system threads are executed as part of the kernel (and are “critical”), so there are no “non-critical” areas in the operating system;
 - B. Gamache et al. use “ganging” to address SMP problems; and

- C. Gamache et al. do not address the problems that the invention deals with, and further, Gamache et al. are of no assistance to the skilled technician seeking to address the problems of the invention; and
- II. With respect to United States Patent No. 5,771,382 issuing to Wang et al.:
- A. the methods described in this reference do not apply to the invention; the techniques described by Wang et al. apply to user data, and not to code calls. That is, Wang et al. describe techniques for protecting uninitialized static variables, and not operating system calls; and
 - B. Wang et al. merely describe semaphores, which are generally used to protect conflicts in non-operating system calls.

The conference call ended a discussion on what further action should be taken. The Applicant advised that an amendment after Final would be filed for the Examiner's consideration.